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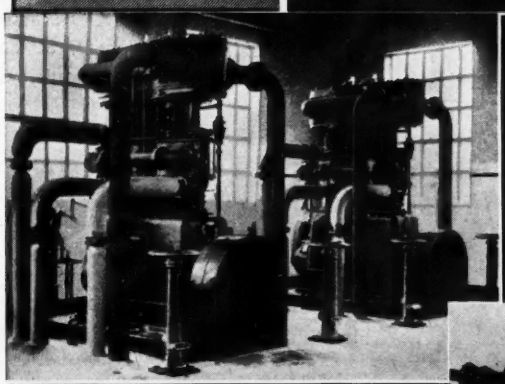

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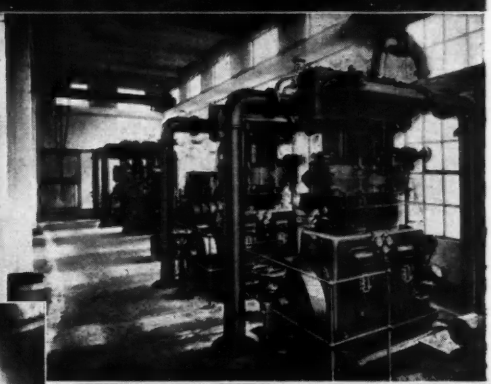

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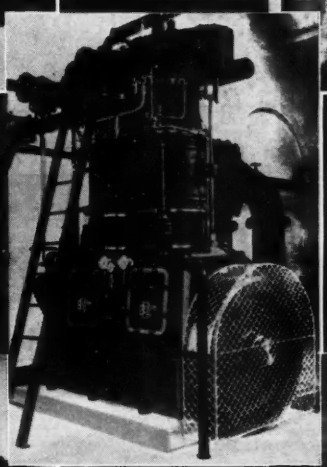

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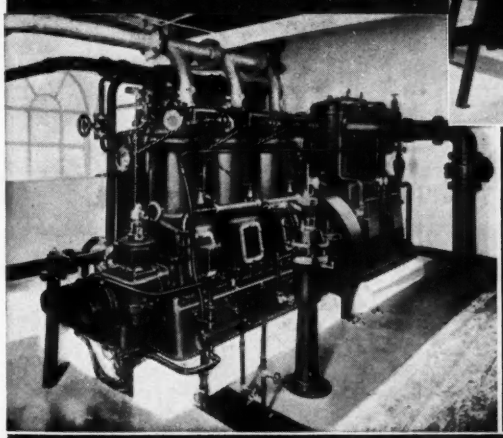

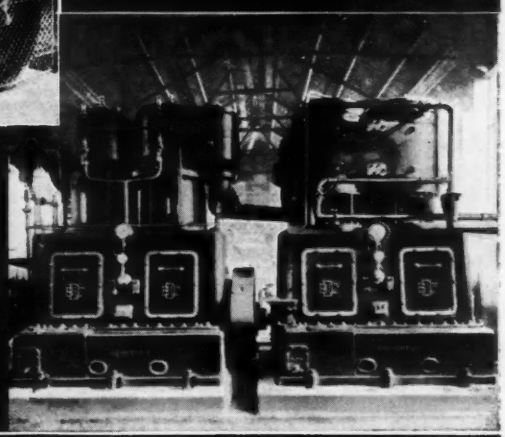

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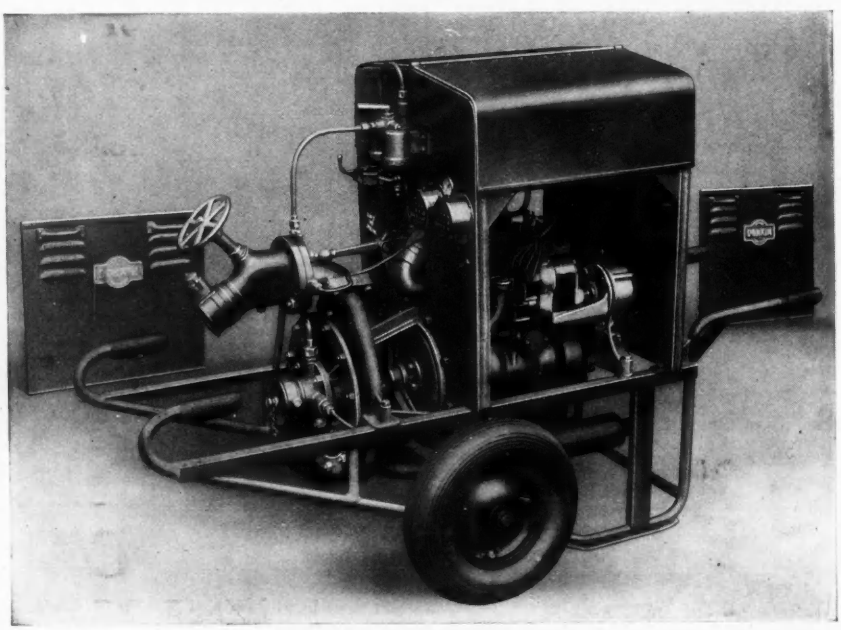

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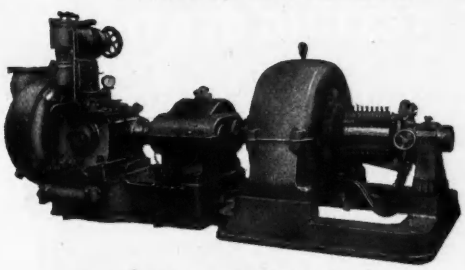

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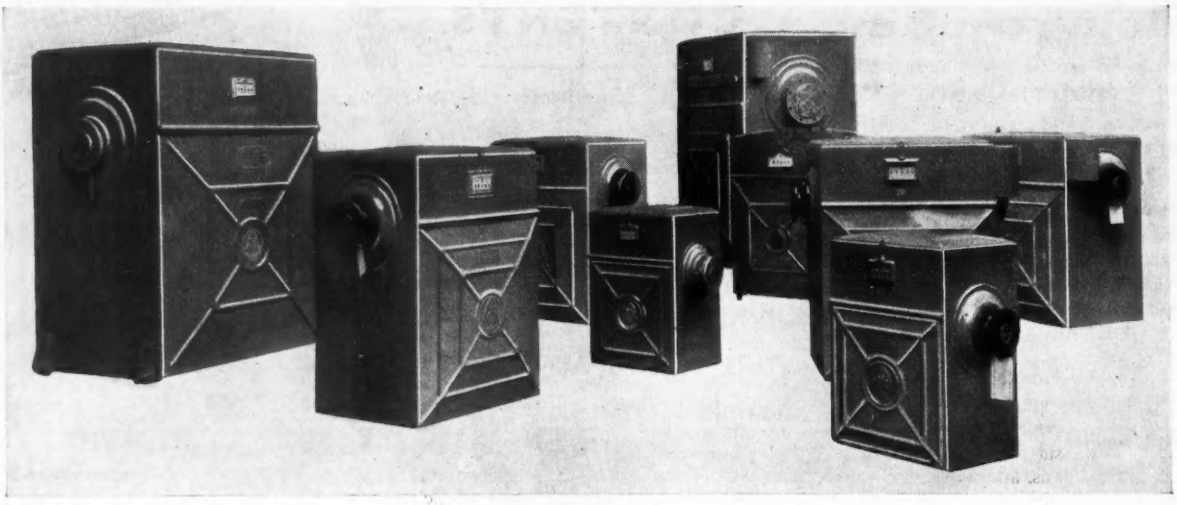

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GAS JOURNAL, JULY 23, 1941

VOL. 235 93rd YEAR No. 4079

EDITORIAL NOTES

MAINTAINING PRESTIGE

THE Gas Industry just lately has been thinking on a rather large scale about the future—that indefinite future after the war in which calorific values, by general agreement, ought to be standardized, gas undertakings grouped on a geographical basis, and even the Technical Press might have an important role to enact. Even before the excellent Institution Symposium set us all thinking along certain definite lines, one or two "JOURNAL" articles had focused attention on the great need to begin pondering upon problems which must vitally affect the Industry's very existence in the promised new world. We know, too, that there had been a private stirring among certain of the men of vision in our ranks, even to the extent, we believe, of a circulation of memoranda as an initial attempt to crystallize some of the difficulties into assailable shape.

There, indeed, lies the difficulty. Where, when, and how is thinking to become doing? "What are we going to do about it?" asked Dr. E. W. Smith in a stirring peroration to his Discussion contribution. Yet, until Mr. F. G. Shaw's proposal for a General Staff (see p. 94 last week) there was a conspicuous absence of suggestions as to how even to begin to progress from the thinking to the doing stage. And so, whether Mr. Shaw's scheme meets with general approval or otherwise, we give it a hearty welcome as being concrete. Whoever knows a better, let him proclaim it.

Let us remember, too, amid this welter of thinking how to begin to plan for the future (important and urgent though it undoubtedly is) that the present must remain with us till the future arrives. The gas engineer in the blitzed city will no doubt call that a stupid remark. A good many who are not will perhaps counter that they are too busy raking the dust in their yards for possible unsuspected coal reserves to forget the present, and still more the winter months which are approaching. Yet, if we entirely neglect certain aspects of the present, what can we expect the future to hold for us? One matter which we know is causing grave concern at the moment is maintenance. A mainstay of Gas Industry policy for years past, and, indeed, one forced upon us by the very nature of our product and the means of its utilization, it is undoubtedly suffering neglect at the present time. Undertakings' staffs have been depleted by the call of the Services and of emergency work, either precautionary or remedial, on the district; fittings and spares of all kinds are scarce; there are other more urgent matters to hand. These are a few of the more obvious reasons, and even if they are very genuine difficulties, we think every effort should be made to surmount them.

Goodwill had been built up prior to the war, and "service to consumer" was not a question of lip service. It is our opinion that efforts should not cease now to ensure as far as possible continuity of this service in wartime. It is not only depressing but disquieting to come across instances of what can only be termed carelessness or neglect. Not long before the hot weather came upon us we took note of many appliances in public and semi-public places which were in need of attention—in need of proper maintenance or in need of replacement. The latter course is not the affair of this note on wartime conditions, but it was distressing to see such a number of out-of-date models. It is the aspect of maintenance which we have in mind. Fires in plenty had, for example, an ill-assorted collection of radiants, and even in wartime the effect upon the public mind must be adverse to the Industry—an effect of slovenliness and noisiness likely to influence future gas sales when peace returns.

We believe that the Gas Industry cannot afford to lose prestige, and that with a little greater effort it can at any rate retain a very great deal of the prestige it built up prior to the war. The manufacturers have spent much time and money on research to supply apparatus which will give the best service in spite of varying calorific values. The correct adjustment of the burners is a matter of importance, but fitters can soon be instructed on the necessary steps to take.

Conservative industry as we are, surely here is a case for the recruitment of female labour where such is obtainable. So successful was the employment of women on maintenance work at Neath during the last war that it was continued there as a permanent peacetime policy, and Mr. Clark Jackson has often referred to the satisfaction which the policy has given. It is not the habit of the "JOURNAL" to take for granted that everything which may be desirable is possible. Even in peacetime we never assumed that gas managers were entirely devoid of sense or business acumen, and still more in these days must they find difficulty in carrying out much work which normally would be regarded as essential. At the same time, we do know that outside observation of the maintenance situation in general has recently called forth serious comment, and especially unfavourable comparisons with what the electricity industry is doing. Where attention can be paid to it, it undoubtedly should be; it is well worth an effort.

WHAT IS AN EDITOR?

"FROGS and snails and puppy dogs' tails, and such are little boys made of." But what of editors, editors of technical and specialized journals, to boot? One answer, and we do not hesitate to give it prominence, was supplied bolt-like from the blue by Mr. J. W. Napier during a luncheon speech on "Kindred Associations" at the recent successful meeting of the Waverley Association of Gas Managers —*vide* last week's 'JOURNAL,' p. 107. Now Mr. Napier said that the editors of our Technical Press should be more than mere technicians "displaying the knowledge of others throughout their pages." They should, he continued, be eminent and individual forces; and if editors are to adorn their high office, then they should be "men of high literary taste, men who are disciples of great thinkers and writers, possessed in some measure of the philosophy of a Carlyle and not without poetic instinct and love of art. Without these finer qualifications which make for eminence our editors' pens will be dull and dreary." What does all this mean?

To be frank, and striking right away a personal note, we had never conceived it as the function of the editor of a specialized technical paper to air his particular poetical fancies weekly or at more or less frequent intervals in his columns. We suppose that most people in their spare time read according to inclination, and we have no reason to think that gas engineers as a body have no poetic soul, no feeling beyond their retorts and their coke dumps. But as yet we have not considered it our province to pry into their minds to ascertain whether (according to our standards) they were or were not erudite—in a word, well-read. The idea does not appeal to us; we do not pose as leaders of literary opinion, and in modesty, we try to respect the modesty

of our fellow engineers. Not, by the way, that we could not, if prodded sharply from behind, express a few purely personal and doubtless inconsequential views on past and current writers. It would amuse us, but would it help the executives and staff of gas undertakings and of gas making and using equipment firms? Suppose we let ourselves go, and say with conviction and deep feeling that Carlyle has always given us a pain in the neck, that we cannot stand Burns at any price, even at 2d. in the late Paternoster Row, and so on; who would benefit?

For ourselves we should enjoy a little gentle exercise of the nature, provided it was not taken too seriously by the Board of Examiners of the Institution Education Scheme. For all Mr. Napier really knows of our poetic instincts, we may even be capable of moralizing through the ages, pointing, for example, to the dangers which might beset young girls if they took too deeply to heart certain Greek poetry, or the pitfalls awaiting manly lovers who studied Lucretius (that poet-scientist) too closely. We could discuss the effect likely to be produced at a pre-war dinner of, say, the British Gas Federation, if the edict of a certain Emperor described by Montaigne were carried into effect. Again, *cui bono?*

No; it may be against our every inclination, but we think it is the dull and prosy pen which must be requisitioned to discuss Wobbe indices, A.T.B. control, C.A.B. tests, fractional distillation, catalysis, hiding our blushes when we fail, as sometimes fail we must, to do justice from the high literary, the philosophical, the poetic, or the artistic point of view, to these important subjects—important, that is, to the hard-worked, practical men for whom the "JOURNAL" endeavours to cater in this scientific age. And we still think we shall be right in pursuing our aim of "displaying the knowledge of others" throughout our pages, and discussing it intelligently rather than posing as universal teachers of the art of egg-sucking to grandmothers. For an Editor is a very ordinary sort of fellow, composed maybe in boyhood of frogs and snails; but as an editor of a technical paper he tries to supply his readers with information helpful to their professed calling—the while being mindful that they may well also subscribe to that intellectual treasury of a *Blackwood* admired by Mr. Napier.

Personal

On July 12, Mr. GEORGE WILKES, well known in the Gas Industry as the Senior Representative of the Parkinson Stove Company, Ltd., completed 50 years' service with the Company. To celebrate this worthy record and to show their high esteem and appreciation of the valuable services rendered during this long period, a presentation was made to Mr. Wilkes on behalf of the Chairman and Directors, at a special gathering of his colleagues. The presentation was in the form of a silver salver, engraved with the names of all the Directors.

During his long association with the Gas Industry, Mr. George Wilkes has endeared himself to all whom he met on his travels and year by year accumulated a wealth of experience. Prior to joining the Parkinson organization in 1891, he was engaged in the Fittings Department of the City of Birminghan Gas Department. In the 62 years during which Mr. Wilkes has been associated with the Industry, he has witnessed an enormous development in the design of gas appliances and in their production. When he entered the Industry very few gas appliances were being manufactured, and Mr. Wilkes has seen the birth and growth of most of the large manufacturing concerns which are to-day engaged in their production. His eldest son, George L. Wilkes, is Distribution Superintendent of the Luton Gas Company, and another son, L. N. Wilkes, succeeded his father some years ago as representative of the Parkinson Stove Company in the Midlands area.

* * *

As we go to press we learn that Mr. W. A. HOWIE, Engineer and Manager of the Gravesend and Milton Gas Light Company, has been appointed to the Maidstone Station of the South-Eastern Gas Corporation, Ltd.

* * *

Mr. HECTOR BROWN, a member of the staff of the Dumfermline Corporation Gas Department for the past 12 years, has been appointed Assistant Engineer and Manager to the Batley Corporation Gas Department.

* * *

Mr. THOMAS HAXTON, employed by Cowdenbeath Gas Company, has been appointed Gas Manager at Gorebridge.

* * *

Miss A. M. S. WILSON, Acting Secretary, is leaving the Women's Gas Council to take up a new position under Government control. The Women's Gas Council have agreed to second Miss Wilson for the duration of the war, and arrangements are being made for the work of the Council to be carried on during her absence.

Letter to the Editor

A Substitute for Oxide

SIR,—With the interruption of supplies from some of the normal sources, the question of iron oxide for gas purification has no doubt been a matter of some concern, while any wide extension, e.g. to coke ovens, of gas purification has not been a practical possibility, however desirable it may have been from the point of view of the national sulphur requirements. The Gas Industry may be glad, therefore, to have information about experiments which have been undertaken by Imperial Chemical Industries, Ltd. These experiments indicate that the requirements of iron oxide may be substantially reduced by making use of bacterial action. It is our intention eventually to publish a detailed account of our work, but we think it advisable to anticipate this by a preliminary statement.

We have found that sulphur bacteria, such as are almost invariably present in peat, can be used very effectively for the oxidation of hydrogen sulphide to sulphur if the correct conditions for their activity are observed. These conditions are not difficult to secure, and in some respects give more latitude than oxide purification as normally practised.

The origin of our observations was an attempt to lighten and reduce pressure drop in oxide boxes by the use of peat. This is, of course, a well-known device. In pursuing our investigations, however, we found improvements in efficiency of purifiers much in excess of what might be expected from any such mechanical effect, and we observed that the amount of peat mixed with oxide could be raised to very high proportions with no diminution in efficiency. This result was finally traced to the presence of sulphur bacteria, whose characteristics we are now investigating, which were found to be present in the peat used and which were actively producing sulphur in the boxes. Finally the conclusion was placed beyond all doubt by running an experimental box filled with peat alone which acted as an efficient purifier for a considerable period, during which elementary sulphur accumulated in the peat to a final figure of 70%.

We find that the best practical application of this discovery is to use a mixture of oxide and peat, which we have used in our full-scale boxes at the Billingham plant for many months. These have been charged chiefly with a mixture of 50% peat and 50% of low-grade spent oxide (by volume). Purification of water gas to the degree required for subsequent processes is proceeding very satisfactorily, there has been no development of excessive pressure drop, the purchase of new oxide has been much reduced, and a means has thereby been found of converting the low-grade spent oxide, which had previously been dumped as valueless, into a material of high sulphur content which is readily saleable. Addition of more fresh peat to this spent peat-oxide mixture produces a mass whose activity and sulphur removal capacity are as good as those of the original mixture, and results in a finally spent mass of yet higher sulphur content.

We have no large-scale experience of bacterial purification of coke-oven gas, but the results of small-scale experiments lead us to believe that the bacterial method will be just as effective with this gas as with water gas.

As to conditions, it is necessary to supply a small quantity of ammonia to the bacteria, but this is already common practice with oxide boxes. We find, for example, that with water gas containing 0.3% H_2S we obtain good results with a concentration of 0.03% of ammonia in the gas entering the boxes. Peat and peat-oxide mixtures are much less sensitive to temperature changes than boxes containing oxide alone. The activity of peat itself is as great at 10° C. as at 30° C., and is only slightly reduced at 4°C.

It should be stated finally that our efforts have been directed to purification of gas for industrial purposes, for which the final sulphur content does not need to be so low as for town gas supplies. It is possible to obtain trace removal of H_2S with peat and peat-oxide mixtures under suitable conditions; whether this degree of purification can be achieved consistently in the large-scale purification of town gas remains to be seen. With a series of boxes such as is usually available, it would be possible to ensure a satisfactory final purification by filling the last box of the series with oxide.

We shall be glad to give any further particulars which we have available to any gas producers who wish to go further into this method of replacing imported material.

Enquiries should be addressed to:

The Research Manager,
Gas and Power Section,
I.C.I. (F., & S.P.) Ltd.,
"Willowmere," Hartburn, Stockton-on-Tees.

(Signed) M. P. APPLEBEY,
Research Manager, I.C.I. (F., & S.P.), Ltd.
(Signed) J. HUGHES,
Gas and Power Works Manager,
I.C.I. (F., & S.P.), Ltd.

July 16, 1941.

Continuing their Good Work on the Kitchen Front the Leamington Priors Gas Company have recently opened a Food Advice Bureau, which is to work in conjunction with the Ministry of Food and the Education Authorities. On each day during the inaugural week a well-known personality was present, and the proceedings included demonstrations.

A Series of Vegetable and fruit cookery demonstrations was held this week by the Stockport Gas Department. Three Ministry of Information films were also shown and the Company's Demonstrator gave a very useful talk on food values.

Awards for Gallantry

The King has given orders for the following awards for brave conduct in civil defence:

George Medal

E. F. Bradley, Assistant Mains Superintendent.
G. Davis, Trunk Mains Inspector.
C. J. Bell, Valve Locator and Assistant Foreman.
N. J. Potts, Valve Locator.
(All of the Gas Light and Coke Company.)

A. Letts, Relief Service Layer Foreman.
F. W. Rourke, Lorry Driver.
(Both of the South Suburban Gas Company.)

W. Mills, Foreman, A.R.P. Mains Repair Squad.
J. T. Hughes, Member, A.R.P. Mains Repair Squad.
(Both of Stretford and District Gas Board.)

National Gas Council

Meeting of Central Executive Board

A Meeting of the Central Executive Board of the National Gas Council was held at Gas Industry House on July 8, at 12.30 p.m. Sir David Milne-Watson, Bart., LL.D., D.L., Chairman of the Board, presided.

Coal.—(*a*) A Resolution passed at the meeting of the South-Western District Executive Board on May 23 drawing attention to the serious coal position in that area was submitted and considered. The Resolution contained the names of the 37 representatives of gas undertakings who were present at the meeting.

(*b*) It was reported that a Resolution, which had been passed at a Meeting of the National Joint Industrial Council for the Gas Industry on June 10, had been forwarded to the Prime Minister. The Resolution drew attention to the serious shortage in the production of coal at the pits. Appended to the Resolution were the names of the employers representing the various Regional Councils throughout the country and of the representatives of the Trade Unions.

(*c*) A deputation by the Coal Sub-Committee and the Conjoint Conference of Public Utility Associations to the President of the Board of Trade which took place on June 11 was reported. At this interview there was a full and thorough discussion of the coal position.

(*d*) Letters written on the instruction of the Board of Trade to the Chancellor of the Exchequer and the President of the Board of Trade dated June 17 were also submitted.

Further steps which have been taken by the Government to keep in touch with representatives of Public Utilities, for the purpose of giving regular consideration to the coal position in all its aspects, were reported. A long discussion followed and several suggestions for improving the position were considered. The Board authorized the Committee to continue their deliberations.

(a) Defence (Gas Charges) Order, dated May 26, 1941.

(b) General Licence, dated June 9th, 1941.—The difficulties which were being experienced by gas undertakings under these provisions were considered, and the Board decided upon the action which should be taken in making further representations to the Government with regard thereto.

War Damage Act.—A report of the meeting of the Committee of the Council dealing with War Damage, which was held on June 17, was submitted. It was indicated that at this meeting a letter to the Treasury had been approved and a copy of this letter, which was sent to the Treasury on June 27, was presented. The Chairman stated that there would be a further meeting of the Committee within the next week or so, and that this would be followed by a meeting of the representatives of other interests associated with the Conjoint Conference of Public Utility Associations.

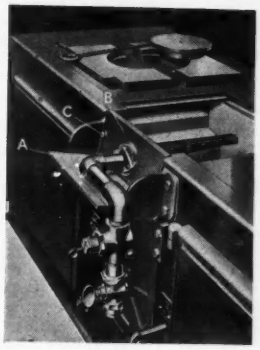
Goods and Services—Price Control Bill.—A report with regard to this Bill has been circularized. The Chairman stated that although the Bill did not apply to foodstuffs or gas, it did contain certain provisions which would require consideration. These conditions were such as would empower the Board of Trade to fix maximum prices both in respect of gas appliances and apparatus and also of hire charges. It was stated that at present there was no indication that the Board of Trade proposed to utilize these powers with regard to the Gas Industry, but the Bill would enable them so to do.

Annual Statement of Accounts—April 1, 1940, to March 30, 1941.—These accounts, having been audited and submitted to the Finance Committee of the Council, were approved. The accounts will be published in the Monthly Report of the Council for June.

Penalty for Deficiency in Calorific Value where the Gas supplied during the Quarter was below the declared Caloric Value, and the Necessity imposed upon the Undertaking of Making a Payment to the Gas Fund.—The correspondence which had passed between the Board of Trade and the Council in connexion with the operation of Section 14 of the Gas Undertakings Act, 1934, in wartime, was reported. The point at issue was the inability of certain undertakings to maintain the calorific value in cases where they were dependent upon intermittent deliveries of coal of unsuitable quality. The Board regretted to learn that the Board of Trade felt themselves unable to accede to the request made by the Council that relief should be given in such cases.

Extension to Emergency Range

The W.O. series of solid fuel ranges produced by the Eagle Range & Grate Co., Ltd., of Birmingham, have had their usefulness further extended by the provision of fittings enabling gas or solid fuel to be employed at option, affording a valuable standby for times of stress. The gas burner and fixing plate can be put into position without alteration to the existing solid fuel firing arrangement, it merely being necessary to provide a 1 in. gas supply, in order that the appliance may operate satisfactorily where mains pressure may have been reduced under emergency conditions.



The fitting of the gas burner and fixing plate is simplicity itself. The charging door (A) is lowered and in its place is set the plate (B), the latter being clamped against the seating of the charging door by means of the two screws (C). The burner, with pressure control and union tap attached, is inserted through the central hole of the plate and so positioned that the level of the flame ports coincides with the centre line of the top flues. When gas is being used the oven dampers should remain permanently fully open. The front air control under the firebox is left open for the first five minutes after lighting the gas, after which time it should be closed.

The normal full-on gas consumptions for the four ranges are from 120,000 to 50,000 B.Th.U. per hour. To facilitate adjustment of the gas rate, a pilot drilling is provided in the burner, and when adjusting the burner the gas pressure control is operated to set the pilot flame to the desired length. When gas fired, roasting conditions are attained within 60 minutes, and the hotplate is ready for use in 20–30 minutes.

B.S. 970 Wrought Steels ("En" Series)

The steel industry has just effected an important and far-reaching piece of rationalization to which effect has been given by the British Standards Institution, issuing a new schedule of wrought steels (B.S. 970). This schedule covers 58 steels and supersedes a number of steel specifications in the automobile series under the numbers B.S. Nos. 5005, 5008, 5010, and part of 5006.

The rationalization has been essentially the work of a Committee known as the T.A.C., under the Chairmanship of Dr. W. H. Hatfield, F.R.S., which has been acting as the Advisory Committee to the B.S.I. in these matters. It was originally appointed by the Ministry of Supply, and has been meeting frequently in Sheffield.

Over 2,000 specifications of Government Departments and private users have been analyzed, and it is considered that the needs not only of the armament industry but of industry generally can be adequately met by the 58 new British Standard Specifications now published.

Together with the specification, the B.S.I. is publishing a report of the T.A.C. describing the steels and giving interesting and useful information about their characteristics. Details of heat treatment and of the important problem of the influence of mass effect are also provided and will prove extremely valuable to designers.

The British Standard Schedule of wrought steels, which will be known as the "En" series of steels, is published in B.S. 970 at a cost of 5s. 5d. net (post free) and is now available. The T.A.C. report will be published as B.S. 971 and will be available in about two weeks' time and will be sold at 7s. 6d. net, 8s. post free.

Copies of these publications to be obtained from the British Standards Institution, 28, Victoria Street, London, S.W. 1.

Orders through Odours

Obtaining orders through appetizing meat odours is the latest sales idea from America. Thousands of people go in every week to pay their gas bills at the Portland Gas and Coke Company, and one of the big problems confronting salesmen was how to interest customers in the appliances on display when they hurried into the building to pay their accounts.

A very effective method was at last found. The tale is told in the *American Gas Journal*. It was to roast some meat in one of the cookers on display. When the customers smelled the appetizing odour of the roast joint they looked around and instantly asked where the meat was being cooked. This was the salesman's opening. The customer was promptly led to the cooker where the meat was being roasted in the oven and was able to see for himself how effectively the job was done. As a point of interest this never failed. It was estimated that the idea increased sales by 25%.

This is the way the plan works. The word was passed around to employees of the Company that meat was needed for demonstration purposes. They were invited to take advantage of the demonstrations by bringing their joints, &c., and have them cooked free. After it was done they got it back and took it home ready to serve after a brief reheating.

MIDLAND PRESIDENT AT HOME

TO its long existing and far-reaching reputation in connexion with such things as needles, fish-hooks, springs, and cycles, Redditch added what must be regarded as another achievement on Thursday, July 10, when the Annual General Meeting and the Spring Meeting of the Midland Association of Gas Engineers and Managers were combined to take the form of a visit to the town of the new President, Mr. C. F. W. Rendle. An inspection of the numerous interesting features of the Redditch Gas-Works formed an important part of the proceedings on the day of the visit.

The carbonizing plant, it may be mentioned, comprises two benches of Woodall-Duckham continuously working retorts. There is also plant by Newton Chambers capable of recovering approximately 660 gallons of crude benzole per day—say, 3 gallons per ton of coal carbonized.

The Gas Company as Hosts

On arrival at the works, the visitors were received by the President, who was actively supported throughout the proceedings by Mr. Leslie E. Clift, the Chairman of the Gas Company, who is to be congratulated upon the fact that he has been on the Board for over half-a-century. The inspection completed, a move was made to the Foxlydiate Hotel, situated amid delightful surroundings some mile-and-a-half away, where members and friends sat down to luncheon as the guests of the Chairman and Directors of the Redditch Gas Company. Both hosts and caterers must have been gratified at the success of their efforts to provide (in strict conformity with war-time regulations) so pleasant a break in the daily work of the visitors, all of whom have been facing added responsibilities, and many of whom have been struggling against dangers and difficulties of a particular nature.

By Way of Stratford

The weather was brilliant, and the countryside at its best. The goal had led many of the travellers through especially beautiful scenery—appreciated better now, perhaps, as part of our glorious heritage than was the case in more peaceful times. The route followed by the writer took him by way of Stratford-upon-Avon, situated in what is surely one of the most lovely of the old-world "Gardens of England," and yet where the modernity of gas service at its best is always in evidence. During his twenty years of service as Engineer and Manager of the Corporation Gas Department there, Mr. F. Shewring has transformed the gas-works more than once, and his forward policy must bring in its train the need for still further extension. Many readers will have still in mind the striking public gas lighting arranged by Mr. Shewring a few years ago—installations which kept Stratford "gas minded" in relation to public lighting, and added fresh laurels to that other fame of which the town has so long and so justly been proud. When normal conditions return, still further achievements by Mr. Shewring in this direction will be looked for, together with a continuation of the successful working results of the past financial year.

Some Formal Business

But to return to Redditch. Preceding the luncheon, there was a short business meeting, at which the Hon. Secretary (Mr. J. H. Wainwright, of Halesowen) presented the minutes of the last general meeting, which were taken as read. The report and accounts were also submitted and adopted.

Mr. G. C. Pearson, of Birmingham, then invited Mr. Rendle formally to succeed him in the Presidency of the Association, recalling the circumstances in which this event had been postponed. The Board were to be congratulated upon having a most capable Engineer. Mr. Rendle had been a member of the Midland Association for 22 years, and was well known to all.

Having been invested with the President's Medal, Mr. Rendle briefly returned thanks; declaring that the informality of the present proceedings would do nothing to detract from his determination to carry on the work of the Association as actively as war conditions would permit. It was a great pleasure to him to hand to Mr. Pearson the Past-President's Medal, in recognition of his services during his period of office.

The following were appointed as the Association representatives on the Midland District Education Committee: Messrs. C. F. W. Rendle, A. H. Cranmer, F. C. Briggs, and W. G. S. Cranmer.

Mr. K. L. Pearce, of Bilston, was balloted for, and declared duly elected a member of the Association.

The Strength of a Town

The party of some 150 who sat down to luncheon included a number of distinguished visitors, among them Sir Frederick J. West, President of The Institution of Gas Engineers, and Sir Albert Ball, who has been Chairman of the Nottingham Corporation Gas Committee for some forty years. Dr. W. T. K. Braunholtz, Secretary of the Institution, attended; but Mr. P. J. Lucas, Secretary of the British Commercial Gas Association, telegraphed his regret at having been detained in London, and his wishes for a successful meeting. Dr. M. Barash, Technical Officer to the Advisory Committee on Benzole Recovery, was present. Mr. Leslie Clift occupied the chair, and, in submitting the Loyal Toast, voiced the pleasure it gave him and his fellow Directors to welcome so large a company.

Proposing "The Town of Redditch," Mr. A. W. Smith (General Manager and Secretary of the City of Birmingham Gas Department) said the town owed a great deal to its Gas Company, because a good supply of gas was undoubtedly helpful in attracting industry to a district.

The response was by Mr. C. H. Blackford, who is in the third year of his second term of office as Chairman of the Redditch Urban District Council, and he pointed out that the real strength of any town is in its people, in its enterprise, and in its industry. When it found itself deficient in any necessary quality, it sought to import it from outside, and one of the best bargains Redditch ever made in this way was when the Association's new President offered his talents to the town. Whether Mr. Rendle was proud or not of his connexion with Redditch, the people of the town were proud to think that he was one of them. He congratulated Mr. Rendle on his new office on behalf of everyone in Redditch, and particularly on behalf of those connected with the Government of the town.

An Unfortunate Fact

"Success to the Association" was proposed by Sir Frederick J. West, who coupled with the toast the name of the President. It was, he said, a great pleasure to him to be their guest that day, and, as President, to hand on to them the greetings and good wishes of the Parent Institution. He expressed the hope that the activities of the Midland Association, coupled with those of the Parent Institution, would lead to the improvement and the advancement of the Industry which they all felt honoured to serve. Despite all the difficulties and complications with which they were confronted, it was necessary for the present, and particularly for the future, that they should maintain their machinery in going order, so that the Industry might be kept in the front-line position which it merited. The Gas Industry might well be proud of its contribution to the war effort, and it was unfortunate that the public were so little alive to this contribution. Though it might not be a spectacular contribution, it was an extremely important one. With regard to the future of the Industry, he referred to the subjects discussed at the recent highly successful meeting of the Institution, and he went on to describe as one of the greatest advantages arising out of meetings such as they were having that day the little talks and conferences between engineer and engineer—the help which they could give each other.

The gratification of them all at the presence of Sir Frederick was expressed by the President in his reply. The reconstruction of the Gas Industry in the sense that the whole world would have to be reconstructed when the war had ended meant, said Mr. Rendle, that they had a busy time in front of them to ensure that the Industry should occupy its proper place in the future.

A Director of the Redditch Gas Company, Major F. W. Smith, T.D., toasted the visitors, and expressed the hope that the day would prove both interesting and enjoyable. Their presence in such numbers was a tribute to the esteem in which Mr. Rendle was held.

Administrators should Give a Lead

Dr. E. W. Smith (Technical Director, the Woodall-Duckham Company) said he had been told that Mr. George Dixon was asked to thank the Chairman and Directors of the Redditch Gas Company for their great hospitality, but owing to shortage of time it had been suggested that he (Dr. Smith) should include this in his acknowledgment of the toast. Nothing more could have been done for the visitors, who appreciated their welcome most highly. He felt particularly pleased to have this opportunity of speaking because, not only was the Association's late President, Mr. Pearson, a very close colleague of his when in Birmingham, but Mr. Rendle was also in those days a very near associate. It was a source of pride to him that these two old friends should both have been chosen to fill the highest position in the Midland Association. Mr. Rendle was one of those engineers who stuck to their works, but if he felt inclined to go further there was no doubt that he would go a great deal further in the Industry. He hoped the Board of the Redditch Gas Company recognized this. The recent meeting in London had been one of the most successful that the Institution had ever held. Owing to the progressive, modern attitude of the then President, the meeting was of a very special nature, and the technical side of the Industry was given full opportunity of showing what it expected. This was all to the good. But he did put it to them that the technical side was now waiting for the policy of the Industry to be definitely decided by the administrators. Therefore he appealed to gas administrators, to the Boards of Gas Companies and to Gas Committees, to get together and determine upon the future policy of the Industry as a whole, so that it would be possible for some of those things to come about which it had been determined by the engineers ought to be done. It was the desire of the technicians that the administrators should give a lead; and this lead should be given soon. Time was getting short. "There is," went on Dr. Smith, "going to be a very broad re-organization of the Fuel Industries? Are we ready for it? Are we prepared to do all that is necessary if we are to have one Unified Industry? In the Electrical Industry the contractors run the Industry. That is not wanted in the Gas Industry. You have all the skill and all the knowledge to do it yourselves, without too much intervention on the part of the contractors."

This part of the day's proceedings was fittingly brought to a close with the enthusiastic toasting of the Chairman.

By permission of Mr. W. C. Devereux, Managing Director, the afternoon was devoted to a visit to the works of High Duty Alloys, Ltd. Unfortunately, Mr. Devereux himself was unable to be present, but his colleague, Mr. W. Sanders, was there to receive the visitors, who before leaving were hospitably entertained at tea by Mr. G. P. Key, the General Manager.

WAVERLEY ASSOCIATION OF GAS MANAGERS

Presidential Address*

of

Wm. C. CAMPBELL

Engineer and Manager, Galashiels Gas Light Company.

IN these days of quotas, rations and artificial scarcities, economy in all things is necessary, and in the main I shall seek to interest you in certain processes closely linked with gas production costs and endeavour to show, in a simple way, how savings may be affected and net cost of gas reduced.

It is one of the characteristics of the gas-making process, as at present practised, that carbonizing efficiency may be as high in the small unit as in the large, and there is fundamentally no reason why the medium and small works should not be operated as efficiently as the larger works. But to maintain this efficiency it is necessary for the engineer not only to keep accurate records of the materials used and results obtained, but to investigate periodically all those processes in the gas-works which use fuel, steam, water and other materials.

Accuracy of instruments and the rigid exclusion of doubtful data are essential if figures are to be of any value, and I am sure you will agree that it is difficult to supervise the operation of plant if you cannot tell at a glance exactly what is happening at any time during the period of operation.

The production of informative statistics need not be a laborious task if tackled in the right way, and is greatly simplified when a proper system is in operation. If reliable instruments are checked regularly they can generally be depended on, but the main problem is to obtain accurate information from the personnel. In the large works the difficulty is overcome by the use of recording instruments, but in the smaller works these are often considered to be an expensive and unnecessary refinement. In a works of the size of Galashiels, however, it is my opinion that a comprehensive range of instruments is justified. The purchase of the equipment had to be spread over a few years, but I am confident that the money was well spent, as the degree of control afforded made economy in production possible.

The problem of accurate measurement of fuel used in the producers and boilers was not easily solved, but a method was eventually adopted which has given good results. Special barrows were made of a type and shape whereby only a stipulated quantity of fuel could be loaded at one time and one barrow is provided for each particular fuel and purpose. This arrangement was in itself, of course, insufficient and it was necessary to obtain full co-operation of the operators so that correct figures could be obtained. I can confidently state that once our men were given a complete insight into the value of figures they showed a remarkable keenness for detail, and I can always rely on figures given to me. The leading stoker on each shift is now essentially the technical operator in the true sense of the term, and they evince a surprising interest in all results which are given to them for their own information. Daily Carbonizing and Plant Record Sheets require that all information given by the instruments shall be noted at predetermined times, and from this information our statistics are produced. Comparative figures are worked out daily, weekly, and monthly and from this information a close check is kept on working results and process costs. A complete statement is worked out quarterly and the men interested are informed of the results obtained. I am sure it will generally be agreed that the efficiency of operation is increased in proportion to the interest shown by the operatives in their work.

Retort Bench Fuel Consumption

The carbonizing plant at Galashiels consists of 12 Glover-West vertical retorts each capable of producing 100,000 cu.ft. of gas at a calorific value of 420 B.Th.U. from standard Scottish gas coals. The settings are heated by two producers, both feeding into a common gas flue. They are of the open-suction type with step grates.

The coal carbonized is a double nut from the Lothian Coalfield, and in general the coke produced is of poor quality. It is evident therefore that difficulties were likely to be experienced with this fuel, and when the plant first went into operation there was an insufficient supply of fuel-gas and the coke consumption was much too high. A grading test showed that practically 30% of the coke then being fed to the producer passed through a ½ in. mesh. During the first full year of working the plant the coke for sale was no more than 4.25 cwt. per ton of coal carbonized.

The poor quality of the coke made was due not only to the low caking properties of the fuels then used, but also to the method of handling producer coke. This coke was stored in a small bunker at the top of the retort house and passed down a long chute to the producer charging level, causing some disintegration. No screening arrangement was available, though it was evident that something of the kind was necessary. The bulk of the fines in the producer fuel could have been removed by hand forking, but in our case this is an awkward task.

The producer was being cleaned six times per day and in consequence the wastage of fuel was not inconsiderable. Analysis of pan ash showed that 31.8% consisted of combustible material and that 15% was quite fit for re-use.

It was evident then that steps required to be taken to improve the quality and structure of the coke and this was quite simply done by coal blending. Generally blending coals to improve coke quality is a process only practicable on a large scale, but some approximation to it may be obtained by careful mixing. The poorest coking fuels having been eliminated from our purchases, an addition of some 15% of highly coking dross was made to the remainder. The rate of carbonization was also increased to avoid disintegration of coke in the retort. A definite improvement was soon noticeable and the following table of grading tests confirms this:

GRADING TEST ON PRODUCER COKE.

	Before	After
Above 2 in. on square mesh	*Nil*	23.8%
2 in.—1 in.	40.4%	46.8%
1 in.—½ in.	29.7%	17.5%
Below ½ in.	29.9%	11.9%

The original procedure of clinkering at short intervals was unnecessary with this fuel, and changes were made gradually until finally the producer was cleaned every 24 hours with one intermediate "prick up." So marked was the improvement resulting from these measures that the coke for sale increased by nearly 45%. This was brought about chiefly by a reduction of fuel used in producers as is shown in the following comparative statement of results:

COKE USED IN PRODUCERS

(Six months to Nov. 31)

		1939	1938
Coal carbonized	tons	2783	2694
Coke used in Producers ...	,,	430.75	673.50
Do.	lb./100 lb.	15.4	24.9
Coke made for sale	tons	862.11	588.50
Do.	cwt./ton	6.19	4.37
Reduction in coke used ...	tons	242.75	
Value at average price ...	27/11d.	£338 16 9	
Less extra cost of dross ...		£44 0 0	
Total Saving effected ...	(approx.)	£294 16 9	

Recently supplies of coking dross have not been obtainable and difficulties with the producer have occurred from time to time. It was then necessary to decrease the interval between cleaning and in consequence coke consumption showed a marked increase. To overcome this the experiment of putting two producers to work was tried and the results were satisfactory, as it was found possible to bank up three steps on each producer, clean less severely, and revert to the programme which previously gave best results.

The following table of comparative results shows the effect of this method and also the effect of marked increase in the quantity of coal carbonized on producer efficiency:

CARBONIZING RESULTS FOR THREE WINTER MONTHS

(December—January—February)

		1938/9	1939/40	1940/1
Gas made	cubic feet	38,668,000	41,022,000	45,550,000
Coal carbonized	tons	2,035	2,274	2,621
Gas made per ton	cu.ft.	19,001	18,039	17,378
Coke made for sale	tons	647	954	1,225
Do.	cwt./ton	6.36	8.39	9.35
Coke used in Producers ...	tons	425	370	390
Do.	lb./100 lb.	20.9	16.3	14.8
Average daily throughput ...	tons	3.85	4.80	5.16

A new coke storage bunker has been put into service recently from which we obtain screened coke for producers. This arrangement eliminates, to a great extent, variation in fuel-gas output, and it has already been proved that the weight of coke charged to producer is reduced by the weight of breeze removed in screening. To obviate difficulty with producers

* Read at the Annual Meeting at Edinburgh, Friday, June 27.

when using coke from stock coal, division plates have been inserted in our coal bunkers and endeavour is made to provide a supply of fresh selected fuel to one pair of retorts at all times and the coke coming from these is used for producers.

A further considerable improvement in producer efficiency is anticipated when the producers are fitted with pressure equipment. It is already established in several Scottish works that this equipment enables the lower grades of fuel to be used in the producer with a corresponding saving in the more readily saleable grades of coke.

I mention this subject, not with the intention of throwing new light on an already threadbare problem, but to emphasize the value of control of fuel consumption in producers. In our case a reduction in coke consumption of 5 lb. per 100 lb. of coal carbonized means a saving of 350 tons per annum, and at present day market value this is equivalent to a reduction in production cost of slightly more than one penny per 1,000 cu.ft. of gas made.

Effect of Return from Residuals on Gas Production Costs

One of the major benefits conferred on the Gas Industry by the introduction of the continuous vertical retort was that it enabled the gas engineer to take full advantage of the main feature of this process of carbonization—viz., the ability to declare a calorific value which gives the lowest cost of production in relation to the coke market. Unless coke commands an exceptional price it is clear that the cheapest gas can be made at the lowest practicable calorific value, but when an unlimited demand for coke exists and the net selling value exceeds the price of coal by a certain margin, the reverse is the case.

While it is with some trepidation that I raise this controversial subject, I wish to show you how, in recent years, return from residuals has exercised a predominating influence on gas production costs in Galashiels, and how we have been able to absorb to a very great extent the increases in cost of raw materials and so maintain the price of gas at near pre-war level.

In the last year or two, in common with other areas, the demand for coke in Galashiels became so great that it was obvious we should be quite unable to meet it without some modifications to our methods of carbonization. All economies in coke consumption within the works had been effected; but, fortunately, the continuous vertical retort lends itself to adjustments by means of which the yield of coke can be increased at the expense of make of gas per ton. In this way the coke sold per ton was raised from 5.67 cwt. per ton to 8.58 cwt. per ton, and the make of gas was reduced from 19,924 to 17,945 cu.ft. per ton. This reduction in make of gas increases the total tonnage of coal carbonized, and consequently that of the coke available for sale.

The decision to pursue this course was made after preliminary results clearly showed that output of coke had a beneficial effect on net cost of gas made. The desire to increase the output of coke coincided with an increased demand for gas, and there was therefore an imperative need to obtain maximum output of gas per retort, which could only be achieved by an increase in rate of coal throughput. On numerous occasions the throughput was as high as 6 tons per day—*i.e.*, 20% over rated capacity. The average rate of throughput per retort per day is given in the following table which illustrates the effect on gas and coke makes:

AVERAGE RATE OF THROUGHPUT PER RETORT PER DAY DURING WINTER MONTHS

(December—January—February)

	Tons per day	Make per ton	Coke Sold per ton
1938/9	3.85	19,001	6.36
1939/40	4.80	18,039	8.39
1940/41	5.16	17,378	9.35

It is obvious that the calorific value of the gas rose above that normally supplied, though latterly the introduction of a benzole extraction plant assisted us over this difficulty.

I do not suggest, of course, that the increased output of coke is entirely due to increased rate of coal throughput and it is not my intention to analyze in detail the effect of this one factor, but rather to try to show how the ultimate net cost of gas production was affected by the increased quantity of residuals sold per ton of coal carbonized.

An analysis of manufacturing costs for the past five years shows that the net cost of gas has not increased despite substantial increase in the gross cost of coal. If, however, a standard price of coal and residuals is applied to the carbonizing results of these five years, the net cost of gas produced shows a steady decline. No allowance for increased handling or wear and tear on plant is made, but on the whole the effect on net cost of gas made would be slight.

The policy has justified itself and in the meantime we propose to continue to operate the plant to produce maximum output of coke. The increased output of solid and liquid by-products is to my mind a valuable contribution to the war effort, and in consequence I consider that we are entitled to receive the necessary additional supplies of raw coal.

Steam Raising

The question of steam raising and steam economy first arose in Galashiels when we found outselves faced with the necessity of installing a stand-by set to our gas-engine driven electrical generator. Owing to the isolated situation of the works it was not considered practicable to obtain electricity from the public supply, and it was decided to continue making our own current by means of a high speed steam-engine driven generator. It was doubtful whether the boiler plant at our disposal was of sufficient capacity to produce the increased quantity of steam required, and it was resolved to do whatever was practicable to improve the steam output from the existing plant by increasing the efficiency of production and transmission.

The steam-raising plant consisted of two boilers—a Lancashire boiler 17 ft. by 6 ft. 6 in. diameter built in 1881 and having a permissible working pressure of 60 lb. per sq. in., and a Cornish boiler 20 ft. by 6 ft. diameter built in 1909 and having a permissible working pressure of 80 lb. per sq. in.

The plant was supplied with water from an underground well in the works at ordinary temperatures, and a water-softening plant was in operation to treat this water. In view of the age of the plant, and as the low working pressure was a decided drawback, it was evident that any changes that were to be made then would require to fit in with a new boiler, whether of the solid-fuel or waste heat recovery type.

Attention was first paid to the boilers with the object of improving working conditions, but expense was curtailed in view of the probable installation of a new boiler in the near future. The following points were attended to and I mention them because each exerts considerable influence on the working efficiency of boiler plant:

(1) External brickwork pointed to eliminate indrawing of cold air into flues.

(2) Internal flues pointed and modification made to facilitate free flow of gases and so improve draught conditions.

(3) Removable doors fitted to bridges to allow weekly cleaning out of ash and dust.

(4) Alteration to blow-down system to allow continuous or intermittent operation.

(5) Discontinuation of adjacent sump which was causing dampness in one flue.

The feed water pipe system was also altered at that time and opportunity was taken to fit a separate water meter to each boiler with a main check meter on the softening plant. The information thus derived is of considerable value and facilitates proper control of each boiler when both are working.

Feed Water Heating

The layout of the steam raising and consuming plant readily lent itself to the introduction of a feed heating system using exhaust steam. A Royle's feed heater was therefore installed and connected up in a manner as shown in fig. 1, which illustrates plainly the arrangement made to recover the heat absorbed from the gas by the water in the condensers. The water overflow temperature from the first water tube condenser is regulated and maintained in the region of 100/110°F. and a supply of water for the boilers is drawn off from this. Sufficient water to obtain suitable gas outlet temperature is passed to the second condenser and all overflow from both condensers and water storage tank is taken back through a cooling sump to the well for re-use. The steam from the exhausters and water pumps is condensed in the feed heater and the feed water temperature is thus raised from 100/120°F., the normal temperature in the feed tank, to 190/212° F., depending on the quantity of steam coming forward or the quantity of water being taken by the boilers.

The water pumps work continuously, the speed being regulated to suit the demand for water. The condensate from the heater is run back to the feed tank, any oil in the steam being removed by an oil trap which functions efficiently and has never given trouble. The condensate thus recovered amounts to 10 20% of the total feed water used in winter and 20/30% in summer. The value of recovering this condensate is obvious.

Tests were carried out to determine the value of the system of feed heating and the following results were obtained:

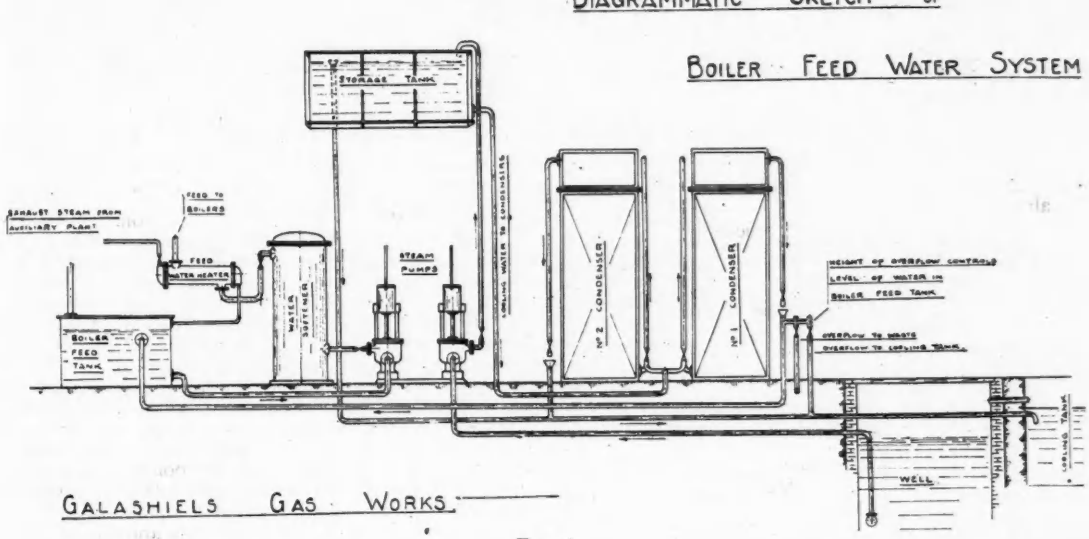


FIG. 1.

EFFICIENCY TESTS ON SOLID FUEL BOILERS

	Without Feed Heater in operation	With Feed Heater in operation
Period of Test	24 hours	24 hours
Water evaporated per water meter	32,000 lb.	30,600 lb.
Fuel used—Breeze	2,576 lb.	2,408 lb.
Doubles	3,808 lb.	2,856 lb.
Average feed temperature—Inlet ...	42°F.	108° F.
Outlet ...	42°F.	198°F.
Average Boiler Pressure over 24 hours	48 lb.	50 lb.
Estimated Calorific Value of Breeze per lb.	9,000 B.Th.U.	9,000 B.Th.U.
Actual Calorific Value of Doubles ...	13,500 ,,	13,500 ,,
Lb. of steam raised per lb. of fuel used	5.01 lb.	5.87 lb.
Efficiency from/at 42°F.	49.7%	59.5%
Efficiency from/at 198°F.	...	51.6%

An improvement of 10% on steam raising efficiency is a most satisfactory result and is equivalent to a reduction in steam costs of nearly £100 per annum, a figure which more than covers the cost of the complete installation.

Steam Utilization

While steam production efficiency is of paramount importance in any works, it must also be borne in mind that efficiency of utilization is equally important if low steam costs are to be achieved. It was always difficult to understand where the total quantity of steam produced in our works was used, as calculations generally left a substantial margin unaccounted for. A careful test was carried out one day in January, 1940, when the average atmospheric temperature was 22°F. and the weather for some little time previous had been severe. Calculations appeared to show that some 45% of the total steam made that day had apparently been used in providing heat to gasholders, frozen coal wagons, messrooms, or lost to atmosphere through condensation. This figure justified investigation, and as the steam carrying lines had been connected in a manner to allow testing separate sections against one boiler, it was possible to trace the extravagant processes. The results were illuminating and decidedly useful as there was evidence of wastage and possibilities of effecting improvement, particularly where steam-consuming plant was widely dispersed. In this connexion the following improvements were carried out:

(1) Long lengths of piping were cut out unless absolutely essential.

(2) All leaky steam valves were replaced and new valves inserted on all branches from the main lines when these branches were in intermittent use.

(3) All steam piping was adequately lagged.

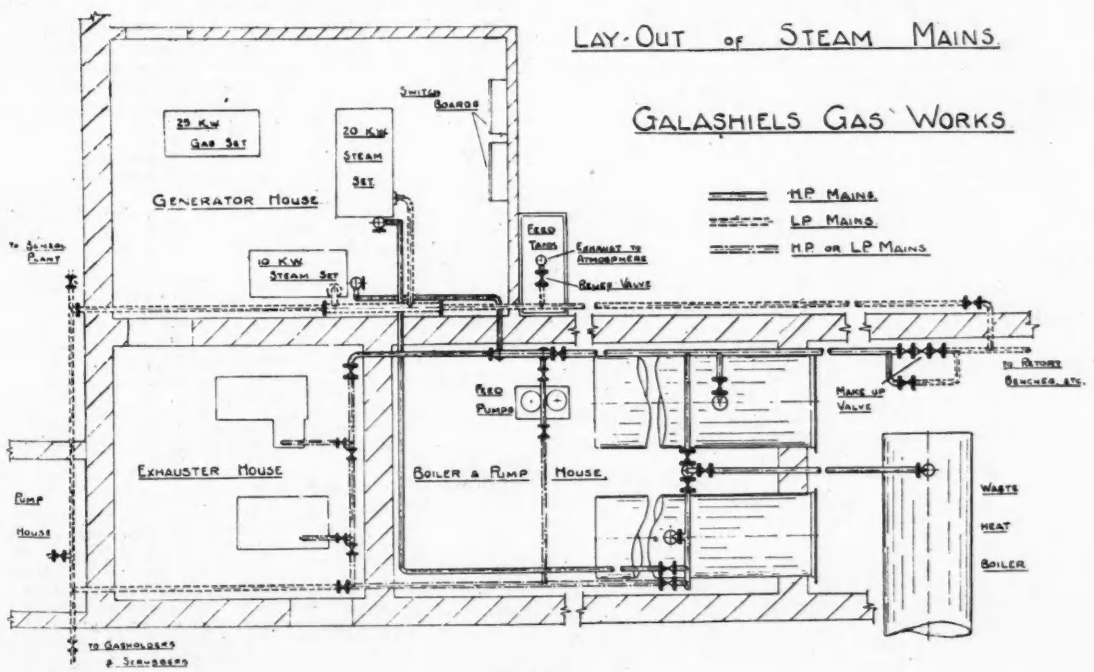


FIG. 2.

(4) Underground steam piping removed, relaid above ground and lagged.

(5) Exhaust steam used to replace live steam where practicable.

(6) Steam engines checked for consumption and overhauled for improvement where necessary.

(7) Steam driven pumps brought together near steam boilers and in general use of steam concentrated in one focal area.

(8) Gasholder steaming arrangement altered; steam condensate and heated cooling water from benzole plant now used instead of steam.

On a day in January, 1941, under almost similar atmospheric conditions a test was carried out which showed that the quantity of steam used in gasholders, &c., and lost in transmission was only 23% of the total steam raised. Actually a reduction in steam consumption had been noticeable for some time previously as the following figures show:

AVERAGE QUANTITY OF STEAM RAISED PER DAY

	1939/40	1940/1	Saving per day
December	50,890 lb.	42,530 lb.	8,360 lb.
January	60,050 lb.	51,400 lb.	8,650 lb.

This reduction in steam consumption in the works, calculated at present day steam costs, is equivalent to a saving of nearly £150 per annum and is most satisfactory. The figures are the more convincing because the steam driven electric generator was used to a greater extent this year than last. Efficiency of steam utilization is undoubtedly an important subject and is worthy of attention in any works.

Feed Water Treatment

Too much stress cannot be laid on the need for treatment to feed water, particularly in fast steaming boilers when it is realized that scale $\frac{1}{8}$ in. thick will increase the fuel bill by some 25/30% as compared with a clean boiler, and it is therefore obvious that proper treatment pays for itself not only in saving in fuel, but also in time expended de-scaling boilers and in preventing damage to this plant.

We have a Permutit base exchange water softener in the works treating boiler feed water which, as has already been mentioned, is drawn from an underground well within the works. This well water has a hardness varying between 12/20 degrees and therefore it is not advisable to use it in the boilers without some form of treatment. The Permutit system is eminently suitable for this work, and though a little scale is allowed to form on the boilers as a protection against corrosion the work entailed in removing this small quantity is not great. In addition to the saving in fuel, the system avoids an annual bill of some £45 for town water, against which may be set the cost of salt for regeneration, amounting to not more than £5 per annum. Maintenance costs are surprisingly low, and the Zeolite exchange material has been in constant use for some twelve years and only now requires renewal. The necessary attention is provided by the works foreman and requires about 3 hours per week.

The following analysis of steam costs for the year ended May 31, 1940, are given below:

STEAM COSTS

For the Year Ended May 31, 1940

Fuel	Quantity Used T. C.	Price per Ton	Total Cost £ s. d.
Breeze (own)	562 —	10/-	281 0 0
Breeze (purchased)	101 13	16/3	74 17 7
Dross (rough)	177 7	21/5	196 16 3
Double Nuts (stock)	204 —	23/5	234 3 6
Total	1,044 —		£786 16 4
Water evaporated during the year per meters			13,969,600 lb.
Steam made per lb. of fuel as fired			5.97 lb.
Cost of steam per 1,000 lb.			13.50d.
Cost of steam per 1,000 cu.ft. of gas made			1.51d.

Even in a small works attention to steam economy is worth while, and the modest expenditure entailed in providing special equipment is justified in view of the potential savings to be effected. In our case a reduction in costs of some 35% has been achieved by the introduction of these methods, and this is equivalent to a reduction in gas production cost of nearly one penny per 1,000 cu.ft. of gas made.

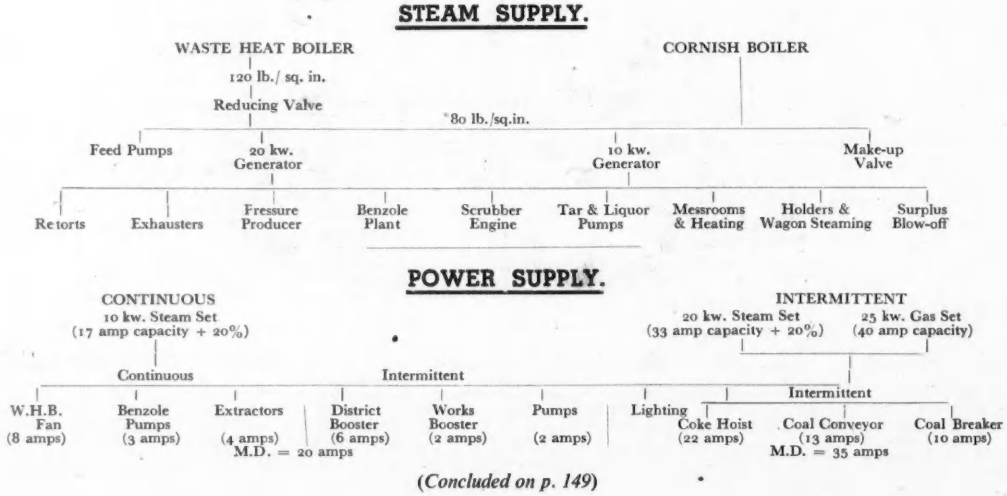
Heat and Power from Waste Heat Steam

Generation of steam from waste heat is an obvious way of reducing steam-raising costs, and if steam thus raised can be applied to heat and power purposes in an efficient manner, these costs should be reduced to a negligible amount. A combination of electricity for certain power purposes, with steam for process work, seems to offer many advantages, both economic and operational. The simplicity and efficiency of transmission of electricity to widely dispersed points of application, the convenience and adaptability with which it can be installed to effect every purpose for which power is required, the ease with which it can be controlled and the general cleanliness of its operation makes the electric motor ideal for gas-works use.

As I believe you will be interested, I propose to give you a brief résumé and details of a scheme which is presently being carried out in Galashiels Gas-Works by which it is intended to reduce power and process costs to a minimum. While such a scheme is by no means novel, its application in a small works is unusual.

Steam will be raised in a waste heat boiler and will be fed directly to electrical generating plant. The pressure exhaust steam from this plant will be utilized for process work and for certain power purposes. The atmospheric exhaust from the steam power plant will in turn be utilized for feed water heating, and the condensate thus formed will be re-used for steam generation. The electricity so produced will drive certain dispersed power plant. The pipe system is so designed as to provide such manipulation of plant as will be necessary to allow full and economical use of the available waste heat steam.

The new Spencer-Bonecourt boiler, 4 ft. 6 in. diameter by 15 ft. long, is of standard design complete with all necessary mountings, fittings and superheater to give 50°F. superheat. Induced draught is provided for by a Davidson "Sirocco" fan, driven by an L.D.C. squirrel cage motor developing 8 h.p. at 960 r.p.m. The motor will be pipe ventilated and the flexible coupling on the connecting shaft will be insulated to prevent heat creepage to the motor. The fan shaft will be carried in two ring lubricated water cooled bearings arranged on either side of the impeller.



(Concluded on p. 149)

DISCUSSION ON THE INSTITUTION SYMPOSIUM—THE GAS INDUSTRY: 1941 AND AFTER

We continue our report of the discussion on the nine short Papers submitted at the 78th Annual Meeting of The Institution of Gas Engineers.

(Continued from p. 106 of last week's issue)

Paper by R. J. Rogers

Mr. **C. W. Cook** (Bournemouth) wrote: I am of the opinion that rational standardization, as opposed to total standardization, would definitely be a step in the right direction; for example, standard oven control, *i.e.* standard range of thermostats, would not only simplify the cookery book, but also the work of the Home Service Department, the work of the salesman and the fitter, and service and maintenance.

Similarly, standard sizes of ovens would ease the housewives' problem of baking tins and cake plates, grids, gates, and the like. I think it would also be a good thing to standardize control taps. It is generally accepted that maintenance and service would be simplified by rational standardization and, further, necessary stocks of spare parts would be very considerably reduced. Standardization should also reduce the price of the appliance—a very desirable object from the point of view of the salesman and the purchaster. With the advent of enamel and chromium plating, the price of gas appliances went up and up. This, in turn, had the effect of lengthening hire-purchase periods until, during the year preceding the outbreak of war, 10-year agreements were being discussed. I do not agree with long-term hire-purchase. It is definitely not sound business, and lends itself to exploitation by the shady character and is to be avoided.

Rational standardization gave us the cheap and efficient motor car. It should also give us cheap and efficient gas appliances. When refrigerators can be sold at the same price as gas cookers, it will become a rare occurrence to sell one without the other.

While being enthusiastically in favour of rational standardization I am certain that total standardization of domestic gas appliances is to be avoided, for the following reasons:

(i) The purchasing public loves to pick and choose; therefore, to obtain and hold the interest of the prospective buyer and to keep gas in the foreground the showroom must contain a varied assortment of appliances. Total standardization would kill this interest and, to a very great extent, damp the enthusiasm of the salesmen. Experience with the standard cooker of 1922 clearly confirmed this. (ii) There is a real danger that the incentive to make further progress in research and design would be impeded, and the consequent reaction on the Gas Industry as a whole would be most unfavourable. (iii) It is unlikely that manufacturers would agree to total standardization, for obvious reasons.

Mr. **A. Forshaw** (London) wrote: It will already have become apparent that the realization of the policy here advocated by Mr. Rogers depends to some degree on the reaction of the Gas Industry to Sir Frederick West's recommendations in Paper I. This is not to say that standardization of appliances cannot be attained without standardization of calorific values, but that collaboration between the two sides of the Industry will be necessary to obtain the most useful result from any attempt to standardize appliances. I would make such collaboration the text of my remarks. Up to the present, and with certain exceptions, the Gas Industry has been "spoon-fed" by the gas appliance industry. The member of the latter has had to forecast the trend of design as best he might, has incurred tremendous expense in preparing to back his fancy, and has had to "chance his arm" on the market with the result: sometimes he has struck a winner, sometimes he has lost his stake. I merely mention, in passing, the large outlay he may then incur in sales promotion, including both the standing charges of his organization and the extra advertising, exhibition and demonstrating of the now launched "fancy," because they all add to the price which the consumer eventually has to pay. All these considerations call for standardization as urged by Mr. Rogers. It is indeed clear that, *vis-à-vis* our competitors for the domestic load, reductions in first cost of appliances, if they can be brought about by standardization, are bound to be helpful, but it seems to me equally obvious that the gas sales side must either tell us what it wants or be prepared to take what is offered to it.

Mr. Rogers has referred to the first effort on standardization—the National Gas Council Cookers of 1922. These were successful up to a point, but it will be remembered that they were really killed by two things, namely, save in detail they showed no advance on anything procurable during the previous twenty years or so, while the appliance makers began to produce new and exciting models; no machinery existed for improving them and they stood exposed to the keen winds of competition, from which in some instances they were only saved by the loyalty of their begetters in supporting their offspring against something more attractive. In short, as one of my colleagues has aptly remarked, "what started as a milestone became a millstone." The bearing of these observations is that any similar fate must be definitely precluded if standardization is again to be attempted. The only way to ensure this is either for the two sides of the industry to take equal responsibility for the design, and afterwards for the disposal of the cookers, and all that implies, to the public, or for the gas side to leave it to the appliance side and to accept the result *nem. con.* Unfortunately, speaking as one with some experience of conferences, the first alternative would also mean natural difficulties in reconciling conflicting views among the delegates of the various interests.

Mr. Rogers appears to favour the C.P. method, by which, if I may say so, one gets as it were "the lowest common denominator" and boosts the result to the public. I have no doubt this method has had some success across the Atlantic where, to put it mildly, the object of producing cookers was, I have been told, not so much cooking as sales! Over here I venture to say the case is rather different and the net result of a C.P. scheme would, I fear, be a tendency to provide by all makers, great or small, something with a minimum performance sufficient to pass muster and with some "talking" feature or other for the convenience of the sales side.

I make this last remark with memories of two of the latest cooker "features," still, to my mind unfortunately, with us. One of these is the hotplate cover which, unless the cooker is in a bed-sitting room and must be hidden sometime, is a positive drawback, but which fashion forced on us and on the public, many of whom now no doubt regret their complaisance. The other I find mentioned by Mr. Rogers with approval, namely, a streamlined cooker. I yield to no one in my admiration for the streamlined cooker as a work of art, and if that is what the Industry is out to sell to the public no more need be said, but the unfortunate fact remains that streamlining entails either too small a hotplate or too large an oven. This is not the place to go into details of dimensions and parts, but anyone interested may compare the relative sizes of hotplate and oven on existing streamline models and ask himself if they are what he would recommend to give the best and most easily obtained practical performance from a cooker.

It would take too much space to discuss the Author's definite proposals in detail, but in general it seems to me those suggested as suitable for standardization are mainly subsidiary appliances, such as governors and thermostats, the standardization of which would, I agree, be advantageous. Most of the significant features of cookers themselves seem, however, according to Table I, to present certain disadvantages in standardization. Even oven sizes, for which standardization to four sets is put forward as advantageous, depend to some degree on oven type, which in the Table is one of the disadvantageous items. It seems to me doubtful whether, in fact, "side burners or single-back burners" can give of their best in ovens of the same dimensions, and as the protagonists of these types are unlikely to abandon their reasoned preference, some compromise to performance would probably be entailed in adopting the same oven dimensions for both types.

Mr. **H. W. Hodgson** (Liverpool) wrote: Should the Standardization of consumers' appliances be attempted, the wishes and requirements of those responsible for repair and maintenance should be seriously considered along with the requirements of the consumer. I believe that most manufacturers will agree with the Author that total standardization is not advisable, but there are one or two aspects to be considered:

(*a*) Since a cooker could be made to last a minimum of, say, seven years, progress in such matters as general design is certain to be made during that period.

(*b*) Should the standardized cooker be of the modern white-enamelled, stream-lined design, choice may not be so serious a question as the Author supposes.

(*c*) It may be advisable to urge manufacturers to drop some of their "individuality." Each and every make of cooker has different methods of aeration of burners and of door fastenings, a number of which leave much to be desired.

(*d*) If Gas Undertakings were offered a good simple article at the right price their difficulties would be lessened.

The Author states that the manufacture of the same type of cooker by every manufacturer would put an end to progress. I consider that nothing will stop progress and different makes could be distinguished by types and colour or mottled enamel, and the use of both black and white enamel.

I would like to make a few comments on Table I in connexion with rational standardization.

The governors used by the Liverpool Gas Company have proved satisfactory.

Fixed injectors would, I feel, prove a distinct boon in conjunction with a governor. They will ensure perfectly adjusted flames at all times and relieve the fitter and maintenance men of responsibility. The number of sizes of fixed supplies would be endless owing to the calorific value of the gas, and to a lesser extent, the specific gravity. The method of marking these supplies with the morse drill size,

together with the calorific value, would simplify matters considerably.

I consider that four sizes of cookers are too many. The smaller the number the fewer parts are required as replacements for stock keeping. The most popular oven sizes would be 14 in. by 14 in. by 13 in. and 16 in. by 16 in. by 14 in.

I do not advise the fitting of flues to cookers, but all flue spigots should be vented at the bottom to prevent "pull." A more important point is the size of the actual orifice from the oven. To gain efficiency these have been known to be on the small side and tend to induce a smothering effect.

Thermostats could, with definite advantage, be standardized, especially having regard to calibration and temperature range.

When governors and fixed injectors are fitted the tap becomes "just a tap," and should cease to be a complicated piece of adjusting machinery which is quite often not understood and easily upset.

Top bars should be designed to support the smallest pan and should be vitreous enamelled.

Oven grids and gates should be made of rustless material of round section rod.

In a stream-line cooker all connexions should be concealed. All are, at present, difficult to remove, and this could be obviated by using a flange connection similar to that employed on the manifold of an internal combustion engine. Long life cookers are a block on the road to progress, particularly with regard to simple hire. If a cheap cooker were manufactured and provision made for scrapping at the end of, say, 7–10 years, some new cooker with possible improvements could be offered to the public.

The first signs of wear and tear occur with badly fitting doors. Adjustable cam hinges and cam latches will make for improvement.

Gas fires should be supplied with governors. Considerable inconvenience has been caused by the fact that in some cases the height of the flue prevents the fire being placed correctly in position, the distance from the floor being often too great for some of the new tiled grates which are being manufactured at present. A good type of flint lighter gives satisfactory service.

The elements of bowl-heaters should be as robust as possible.

Mr. **A. F. Oatley** (Bilston) wrote: The Author refers to the short life cooker as a highly controversial subject, but this is, I submit, a controversy no longer. This phase commenced and finished during the last four years, when there appeared to be a preference for a cooker of less robust construction, or, in other words, a cheap pressed-steel cooker, as against its cast-iron counterpart. I suggest that the main reason for this can be summed up in one word—price. When, however, buyers found that the difference in price was a matter of a few shillings this demand rapidly fell off.

The increase in popularity, before the war, of a 10-year hire-purchase period prompted many gas Undertakings to investigate and consider the introduction of a cheap, pressed-steel cooker for this long-term hire-purchase, with the object of cutting the quarterly hire-purchase charge to as low a figure as possible. Ultimately, however, and in my opinion, wisely, they decided on the policy of selling a substantially built cast-iron cooker with an easy 10-year life and possibly longer.

Mr. Rogers offers no apologies for including a reference to the standardization of prices, and urges that a scheme of regional standardization should include at least a reasonable standard price for gas appliances. Why should this be regional? Why not national? Why not an agreement between the manufacturing and distribution interests? The whole Industry accepted the basis of purchase tax and applied it—this is standardization. Why not an agreement which standardizes:

(i) A basic purchasing price for all Undertakings.
(ii) A standardized installation charge based on a fixed free to a given run of service.
(iii) A fixed percentage on basic price for replacement of parts based on a fixed guarantee period (general maintenance service schemes excluded).
(iv) A fixed percentage on basic price for general selling expenses.
(v) Items (i), (ii), (iii), and (iv) to equal cash selling price.
(vi) A set scale for hire-purchase finance charges.

Large contract purchasing may still be recognized with a larger discount, but a basic purchasing price should be accepted for the purpose of applying (ii), (iii), (iv), (v), and (vi).

Is there any insurmountable reason why both Gas and Electrical Undertakings should be the isolated exceptions to a general commercial practice? Is it not reasonable to assume that, unless the Gas Industry itself solves this problem, a post-war Government might do so. I feel sure the opinion is that a standard one-price gas appliance market applied to the whole Country is not only fair dealing to the consumer, but would prove an important factor in the uniting of both sections of the Industry. Apart from simplifying, if not totally eliminating many irritating problems directly attributable to this disunity, this step would open up the road to a much closer co-ordinated effort in essential factors, such as general Gas Education and national advertising campaigns, which have hitherto been somewhat disjointed through lack of a united front. Too often already during this war have we seen the result of a disunited effort. Discussions on the subject of standardization, especially that of buying and selling prices, have been going on for many years. In some districts regional agreements are already in operation, standardizing selling prices. I find it generally agreed that to-day and not after the war is the time to flood-light our faults and make every effort to formulate a better operative and marketing policy, rather than to wait until after the war, when the resultant rush for reconstruction will allow no time for sane thinking and considered decisions.

Mr. **J. E. White** (Newcastle-upon-Tyne) wrote: In both cooker and fire policy there are two definite grades of circumstances to be met, namely, those arising out of the loan of moderately priced and comparatively plain appliances to slot consumers, or on simple hire, or long term hire-purchase. These patterns may reasonably be expected to run for some years unaltered. Secondly, there are those arising from the sale or hire-purchase of the more expensive and "de luxe" appliances, the design of which is immediately responsive to changes in fashion or small improvements in construction; in this latter respect stability of design is not now reckoned a virtue, but rather a handicap to sales.

In 1922 the Newcastle Company considered the question of standardization of design for simple hire and slot cookers with the result that four sizes of one series were eventually constructed, these displacing five different series, each of which had six sizes. The hotplates were kept at the same depth throughout, one grill burner, and one pattern grill fret being standardized for all four sizes. This principle was extended to the short and long boiling burners, the drilled and disc type burners being interchangeable. Grid-bars were made interchangeable and the use of the straight boiling burners avoided the construction of right and left hand fittings, the same applying to the oven gates and other minor fittings. This example may serve to illustrate the degree of standardization which, while permitting development, has in actual practice proved of immense value, particularly in respect of workshop maintenance. It is singular that manufacturers do not consider a degree of standardization such as that outlined for many of their appliances. It is uncommon to find even a small degree of interchangeability in the component parts of a range of cookers emerging from one works.

Under post-war conditions one can visualize an even higher degree of service to the consumer than was current before the war, and such service will have to be given by the small as well as by the large Undertaking, in almost equal degree. In this respect one can see the value of standardization, since, as in the example already outlined, maintenance can be considerably simplified. Already standardization of performance and quality is in process of establishment, and this will undoubtedly be to the advantage of the consumer.

On balance, therefore, it would seem that the public, the Gas Industry and the appliance manufacturer all have something to gain through progressive standardization. While one is treading upon dangerous ground, it is perhaps timely to suggest that standardization cannot come entirely through the Gas Industry deciding what are its standardized requirements. Before this ideal state can be reached there remains much ground for mutual agreement among the appliance manufacturers, and much scope for each individual manufacturer for standardization of parts within the range of his own products. Again, taking cookers as an example, one recognizes that if a manufacturer devises, say, an improved boiling burner, an attractive new semi-solid hotplate grid, or a new jet cock, he will be inclined to make then exclusive features of the new range of cookers he is about to introduce, and he may even be tempted to make them deliberately of such dimensions as will prevent them being used as replacements on even his own existing lines of cookers. The short view, of the appliance manufacturers as well as of the Gas Industry, concentrates upon the cooker and the occasional fire as representing the bulk of domestic requirements, and looks to them to provide the major revenue. The long view sees the complete equipment of every urban dwelling house with a full range of gas appliances and gas as the universal fuel. To achieve this, it is just as important that the initial, replacement and maintenance costs of appliances be kept down, as it is that the bulk of the gas required should be available at a low commodity tariff rate.

One hopes, however, that to whatever degree standardization may ultimately develop, it will not cramp the initiative which has been apparent in gas appliance designs for many years.

Paper by W. M. Carr

Mr. **C. Holmes Hunt** (London) wrote: The Author considers that closer co-operation in the working of Gas Undertakings is necessary and favours grouping on a geographical basis. It may therefore be inferred, from a perusal of his interesting Paper, that he considers that the grouping of Gas Undertakings by the operation of Holding Companies has justified itself. He speaks with knowledge and experience on the subject, and his opinion will, I think, be generally endorsed by others connected with the administration of like Undertakings. He has demonstrated further, as in the case of the West Yorkshire Gas Distribution Company, how successful grouping can be effected where circumstances are favourable by the supply of gas from coke ovens to constituent Gas Undertakings over a wide area.

Although Col. Carr's experience has been mainly concerned with the successful co-ordination and grouping of large Undertakings, he does not forget the position—one might almost say plight—of the small Undertakings, and his remark that "the day of the small Undertakings operating as a separately-controlled unit in a restricted area has passed" will receive general approval. In this connexion it may be remembered that consequent on the powers conferred on Undertakings under the Gas Undertakings Act, 1932, to acquire interests in like Undertakings, and to the then threatened competition from the electricity grid, the National Gas Council appealed to Undertakings, and to the smaller Undertakings in particular, to consider, in order to strengthen their individual positions, the question of linking up

with a larger adjoining Undertaking, or if this were not practicable, of joining a group by the formation of a Holding Company. In pursuance of this appeal certain linkings-up and absorptions took place and, where this policy was not practicable, groupings were arranged, and thus the modern Holding Company movement may be said to have come into being. At any rate at least one such Company, embracing certain moderate-sized and small Undertakings, had its origin as the result of this appeal.

It is therefore not too much to say that one of the main objects of this movement of grouping and linking-up was to assist the smaller Undertakings by the creation of large entities, and so to be able to give them the necessary financial and technical help in their development which, as isolated units, they lack. There are some 260 small Undertakings in England and Wales (selling under 20 million cu.ft. of gas per annum), of which approximately 100 are either subsidiaries of a Holding Company or are controlled by larger adjoining Undertakings. Of this number, 50 or so have been absorbed by the modern Holding Company movement. It will be seen, therefore, that although much has already been done in this respect much still remains to be done. These small concerns are experiencing great difficulty to-day in the face of great electrical competition and rising costs, and sorely need, for their economical development, the financial and technical assistance which the larger Undertakings can provide. Cannot the present Holding Companies do more in this respect? It is not in the interests of the Gas Industry as a whole that such Undertakings should be allowed to go under. "United we stand, divided we fall" may well be applied to the position of the small Undertakings to-day.

Our President, Mr. George Dixon, obviously also feels that something must be done in this direction, for it will be recalled that in his Presidential Address in 1940 he referred to the difficulties being experienced by very small Undertakings, and suggested that there would appear to be a case for some District Advisory Boards to offer such assistance as might be required for the benefit of local consumers in particular, and the Industry in general. Col. Carr goes further. He favours regional grouping under the aegis of a Government Department, and envisages the appointment of Commissioners for the purpose of holding regional enquiries for formulating plans for definite regional groups. Is not any sort of Government Control to be avoided if possible? At the same time, it is difficult to see how, without any statutory authority to support it, unwilling concerns can be obliged to submit to such a scheme which, to be successful, must be universal and embrace all units. It is surely better, however, that any reorganization should, if possible, come from within the Industry rather than from without.

There is much to be said for grouping on a geographical basis. Could not the present Holding Companies give a lead in this respect by agreeing among themselves as to their respective areas of operation? In this way any possible overlapping would be avoided and operations would be confined to the development of the units, especially the smaller units, in these respective areas. The effect of this would be to cover a large part of the Country. With regard to any undefined areas, groupings could then be worked out on a geographical basis, and the concerns therein sounded as to their views, as was done by the National Gas Council in 1933.

Any such new groupings would seem to necessitate the incorporation of a new Holding Company or Holding Companies. It is not desirable, of course, that these should be multiplied indefinitely, but there are now existing certain Holding Companies with names suggesting certain geographical areas, the subsidiaries of which are few in number. Might not these form the authority in their respective regional areas and their operations be extended accordingly, thereby avoiding the necessity of unduly introducing new Holding authorities? Capital would be needed to establish any new grouping on a sound and economical basis, but financial interests are closely allied to-day with the technical aspects, and there should be no difficulty in obtaining co-operation in this direction.

Col. Carr says that the problem of co-ordination and grouping of the small Undertakings must be the first consideration of the Gas Industry after the war, but could not some preliminary steps be taken in advance, so that when the war ends the Industry can proceed at once with any schemes already agreed upon?

Mr. **G. M. Gill** (Cheltenham) wrote: This Paper is clearly based upon experiences which are very similar to those of the Severn Valley Gas Corporation and of Gas Consolidation, Ltd., which Companies control 47 Gas Undertakings in the Midlands. To a large extent I agree with all the views expressed by Col. Carr. Anyone working in close touch with a large number of Gas Undertakings, varying in size from small to large Undertakings serving important towns, cannot but be impressed with the vital differences between large and small Undertakings in all matters pertaining to the supply of our consumers.

The large Undertaking is able to supply a better and more consistent quality and pressure of gas and at a lower price than the small Undertaking. It has a competent staff to attend to all the necessary technical and commercial requirements of the business, and has the financial and other resources to do whatever is necessary to satisfy its customers. Not so the small Undertaking, which has difficulties of great variety with which to contend, and as a result the gas supply in small towns, in my experience, does not compare at all favourably with the supply in the larger towns. In the matter of quality of gas, hundreds of tests show that the variations in the quality of gas supplied by small Undertakings is much greater than is the case with the larger concern, and this is our experience in spite of the considerable amount of trouble which has been taken to improve the quality of the gas supplied by all our smaller Undertakings. Again, the gas contains more inerts, is heavier and more corrosive. In saying this I am not criticizing the Managers of small Undertakings, as it is virtually impossible for them to produce gas of uniform quality and characteristics.

This is, in my opinion, one of the reasons why the policy of the Gas Industry should be to produce gas on a large scale, and to abandon at an early date the manufacture of gas in hundreds of small Works in favour of linking up these areas with mains from large works. I have no doubt that our Group will pursue this policy after the War, and we should be pleased to co-operate with others having the same object in view. It is obvious that when laying mains from town to town it is an advantage to co-operate with all one's neighbours and to take gas from those Works which are best able to supply it in bulk. I feel sure that we should be as equally pleased to take gas in bulk as to make it ourselves. The important point is that the gas should be made in a modern type of plant of considerable size, and be available at a reasonable price.

That the linking-up of Works is usually a success can be demonstrated in a striking manner by the experiences of some Undertakings in our Group. The figures set out in Table A show the phenomenal growth in gas output which has followed the closing down of small Undertakings and the supply of their areas by mains from larger Undertakings, and, what is equally important, their control by a competent staff. As will be seen from a study of this Table, the growth in a few years has been enormous, and I have not the slightest doubt that the same experience can be reported by many other members of the Institution.

TABLE A.—Growth of Gas Consumption following Closing of Small Undertakings.

	Distance in miles from Works Supplying Gas.	Gas Sold, mill. cu.ft.					
		1922.	1929.	1930.	1934.	1935.	1940.
Cheltenham:							
Tewkesbury	8¾	....	...	12.0	...	...	39.5
Winchcombe ...	9	...	3.4	...	...	...	16.7
Pershore	19¼	...	15.0	...	...	...	31.4
Broadway	16	...	1.0	...	...	...	31.8
Campden	24½	...	...	...	2.0	...	21.9
Bidford	27½	...	...	...	...	3.5	8.0
Wellington:							
Oakengates	3½	17.5	...	...	...	...	62.0
Hadley	3½	...	18	...	...	...	119.5
Dawley	4	...	...	...	...	14.0	19.1
Stroud:							
Brimscombe	2½	...	...	...	...	10.4	24.0
Painswick	4	...	4.2	...	...	...	11.7
		17.5	41.6	12.0	2.0	27.9	385.6
				101.0			

The above figures show the growth in gas consumption resulting from the closing down of the Gas-Works of the above eleven small Undertakings during the years shown and taking over the supply of these Undertakings by three larger parent Companies. As will be seen, the growth in the gas sold has been phenomenal.

If it is so successful to run mains to neighbouring towns and villages and close down the small Works, why should such extensions be limited to distances of 10, 20, or 30 miles? Why should not these mains be extended to the next large Gas Undertaking, which would contribute its proportion of the bulk supply and likewise extend its mains to the next large Undertaking, and so on? The advantages would appear to be obvious; the work merely requires to be done.

An examination of the gas made in England and Wales, as recorded in the *Gas World Year Book, 1941*, shows the figures set out in Table B. A study of these figures suggests that if these 897 Undertakings were linked up and 736 Undertakings shut down their Works, the comparatively small number of 161 large Works would be able, with a modest amount of additional plant, to take over the manufacture of the extra 13 per cent. of gas now made by the 736 Undertakings. There would obviously be many exceptions, but broadly

TABLE B.—Analysis of Gas Undertakings and Gas Made in England and Wales.

Annual Make.	Number of Gas Undertakings.	Percentage of Total Quantity.
Over 250 mill. cu.ft. ...	161	87
Under 250 mill. cu.ft. ...	736	13
Total	897	100

speaking there would appear to be a strong case for a change of this kind. It would, of course, entail the laying of an enormous grid of gas mains, with a corresponding degree of expenditure, but I am sure that the examination of the problem should not be postponed because of such a consideration, as a study of Table A suggests that the extra amount of gas to be sold by linking up is immense, and can, I am sure, be obtained in no other way. Moreover, after the war, the need to find employment for thousands of men as they are demobilized will be very great, and there is no doubt that the best means of doing this profitably and to the advantage of the whole Country is for each industry to lay its plans, after careful consideration of all conditions, to put itself on a sound economic basis, as it is only by this method that profitable employment can be found for all.

It may be said that the closing of a large number of works would throw many men out of employment, and that therefore it could not be a good proposition from that standpoint, but I maintain that the amount of employment which would be found in the laying of pipe lines and in the making of pipes, in the making of the iron and steel

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for such pipes, in mining the coal for making the iron and steel, and so on, would far outweigh the amount of employment which would be lost by those who suffer in the initial stages. Experience shows that when a Gas Undertaking closes its Works and takes a bulk supply it has to discharge the majority of its Works' employees, but provided that it is progressive and business-like it is not long before the Undertaking is employing more than ever due to the growth of business.

A study of the results which have followed from the development of the electrical grid are interesting. The consumption of electricity has grown from 5,371 million units for the year 1929 to 12,756 million units for 1938, an increase of 137.5 per cent. in the short period of nine years. In the electrical industry, 137 stations from 1938 to 1939 generated 96.3 per cent. of all the current supplied, whereas 10 years ago there were many hundreds of generating stations. A recent report states that, in 1938, 1,640 units were generated per ton of fuel used, as compared with 1,200 units in 1930—an increase of 36 per cent. We know that electrical competition has been much more severe of recent years, due to the rationalization of the electrical industry. There is, in my view, quite as good a case to be made out for the Gas Industry to rationalize on similar lines.

In support of the view that small Gas Undertakings cannot progress like large ones, I have extracted relevant figures regarding the small as compared with the large Gas Undertakings in our Group. These are set out in Table C. I have omitted a number of the small Undertakings now taking bulk supplies, and a few others where the figures

TABLE C.—Comparison of Sales and Receipts by Large and Small Gas Undertakings.

	Therms Sold.		Increase per cent.	Average Receipts.*		Change in Price.*
	1934.	1940.		1934.	1940.	
8 large Undertakings selling over 250 mill. cu.ft. per annum	13,266,000	17,775,000	34	9.74	9.79	+ 0.05
	1933–1936†	1940.		1933–1936.†	1940.	
27 small Undertakings selling under 150 mill. cu.ft. per annum	4,650,000	4,782,000	2.8	12.50	13.16	+ 0.66

* Pence per therm sold.
† The control of a number of these Undertakings was acquired some time after 1934, for which year reliable figures are not available. In these cases the first year when correct figures were obtainable has been taken in arriving at this total. The comparison between the two sets of Undertakings is therefore not strictly fair.

for the two periods are not comparable. As will be observed, 8 large Undertakings show an increase in the aggregate of 34 per cent. in the gas sold during the past 6 years, while the 27 small Undertakings show an increase of 2.8 per cent. only, over a period varying from 4 to 7 years. It should be pointed out that the sales for the latter period suffer materially from the loss of street lighting, but this applies also to the large Undertakings. This comparison supports the view that Gas Undertakings above a certain size are large enough to have plant suitable for making good and cheap gas, and a staff qualified to control operations both in making and selling the gas and in conducting the business of the Undertaking on sound lines. The small Undertakings, on the other hand, have none of these advantages, and as a consequence are not in the same position to compete favourably with other sources of light, heat and power.

It may be asked: "Has not the Holding Company system of control been able to overcome the above difficulties in the case of the smaller Undertakings?" The reply to this is that it has gone some way towards minimizing the difficulties and in improving the conditions of carrying on the business on modern lines, but no central organization can convert a small Undertaking with its disadvantages into a large one with its advantages for conducting a commercial enterprise on successful lines under modern conditions and with the competition we now have to face.

I would call attention in Table C to the difference in the price of gas as charged respectively by the large and the small Undertakings. The prices stated are the average charged to all consumers per therm sold, and give a better idea of the true position than if it were based upon the ordinary domestic price. As will be observed, the average price charged by the small Undertakings is considerably higher than that charged by the large ones, which again militates against the success of the small Undertaking, but it cannot be avoided for the reasons already set out above.

I believe that the general experience in the Industry is much the same as that experienced in our Group; the large Undertakings, if well managed and enterprising, forge ahead, while the small Undertakings report small increases or decreases year by year with comparatively little progress shown. There are, of course, many exceptions, but in the aggregate the progress made has been slow or non-existent, as is shown by a study of the sales of a large number of Undertakings for the year before the war compared with ten years ago. It is for the above reasons that I support the Author's views and consider that he has clearly indicated the lines upon which we should prepare our scheme of post-war reconstruction. Of one thing I am certain, and that is that we cannot afford to let things take their chance and do nothing until it is forced upon us. It will then be too late.

(To be continued in a forthcoming issue)

Waverley Association of Gas Managers.

(Continued from page 138).

A new alternator of 10 kw. capacity, driven by a high speed steam engine of 16½ b.h.p. designed to operate against a back pressure of 35 lb. when receiving steam at 80 lb., and of the no-lubrication type, will be installed to operate in conjunction with the existing steam driven set, which will be altered to work under similar conditions. The 10 kw. set will be operated from an independent switchboard, which will, however, be connected to the existing switchboard and will thus allow a supply of current to be available under any given set of circumstances. As the two alternators are capable of parallel operation a synchronizing gear will be provided to assist the bringing in of a set to assist the one on load when circumstances require this.

The 10 kw. set will run continuously at near full load, supplying current to the following motors:

Duty	H.P.	Revs.	Amps	Amps on Load*	Rating
W.H. Boiler ...	8	960	12	8	Cont.
Benzole Pumps ...	3	960	6	3	,,
Extractor	4-5	750	7.5	4	,,
District Booster ...	6	1,500	12	5/10	Int. (¼ hour)
Works Booster ...	1.5	2,900	2.5	2	,, (2/4 hours)
Pumps	1.5	1,440	2.5	2	,, (1/2 hours)

* Estimated.

A new 20 kw. set will be brought in intermittently to take the load of the heavy plant driven by the following motors:

Duty	H.P.	Revs.	Amps	Amps on Load	Rating
Coke Hoist ...	16	955	22	22	Int. (15 mins.—hourly
Coal Conveyor ...	12	725	17	13	,, (1/3 hours daily)
Coal Breaker ...	12	725	17	10	,,

The 20 kw. set will be still able to operate, though with reduced output, at low steam pressure (35/50 lb.) when exhausting directly to atmosphere as will be necessary when the waste heat boiler is out of action. The existing 25 kw. gas set will act as stand-by to both sets but may also be used in certain circumstances.

The new pipe lines are arranged to provide means of utilizing all the steam produced by the waste heat boiler in the most economical manner possible. The intention is to produce steam at 120 lb. in the waste heat boiler which will be reduced immediately to 80 lb., the permissible working pressure of the Cornish boiler. This boiler will operate in conjunction with the waste heat boiler. The bulk of the steam produced by the waste heat boiler will be taken by the electrical generating sets which will exhaust into a 35 lb. low pressure line from which most of the other steam consuming plant will be supplied. The general layout of the system is shown, and it will be noted that certain plant can be supplied by the high or low pressure mains depending on prevailing conditions. Effort has been made to utilize all exhaust steam from ancillary plant and where possible to trap condensate for re-use.

The rated output of the new waste heat boiler is 2,890 lb. per hour from and at 212°F. at normal load with 20% overload capacity. The calculated output from the boiler under present carbonizing conditions will be 1,550 lb. per hour on winter load and 980 lb. on summer load. The output of the boiler will be controlled by a finely adjustable damper plate in an augmentation flue and by the blower valve on the pressure producer. While the present hourly demand for steam is 2,150 lb. per hour on maximum winter day and 1,000 lb. on minimum summer day, this consumption will be reduced with the new system.

London Gas Companies need women workers to replace men called up for active service. Dozens are already employed but many more are needed, especially on some of the Works, said an official of the London Regional Gas Centre, recently. Women who had never worked outside their own homes are now busy in retort houses—and taking their turn on night shift; acting as bricklayer's or fitter's mates; loading oxide; painting purifiers—in fact, doing a dozen man-sized jobs.

Dunfermline District Council have agreed to accept a final offer by the Cowdenbeath Gas Company in connexion with the street lighting agreement for Aberdour and Crossgates. The final offer is that the charge of 16s. 11d. per lamp for Aberdour and 15s. 11d. per lamp for Crossgates be reduced to 13s. 4d. per lamp in each case.

Prominent Local and Ministry of Food speakers addressed audiences on aspects of food economy—among them Lady Margaret Grant, who is a B.B.C. speaker—at a Kitchen Front Food Week and Exhibition recently held by the Altrincham Gas Company. Cookery demonstrations were given each day, followed by Ministry of Food films, and in addition to this, 200 senior school children attended each day. They were encouraged to design original posters concerning food economy and these were later exhibited, together with war-time dishes which they had also prepared. The afternoon was devoted to gardening, and altogether the week proved to be very successful.

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Gas Products Prices

The London Market

July 21.

The prices of Tar Products in the London Market remain to-day approximately as follows:

Pitch is nominal; creosote 4¾d. to 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole 1s. 10d.; 95/160 solvent naphtha is 2s. 5d. to 2s. 8d.; and 90/160 pyridine about 13s. 6d.; all per gallon naked; refined crystals naphthalene £23 per ton in bags; all prices *ex* Makers' works.

Tar Products in Scotland

GLASGOW, July 19.

Prices show no material alteration with trading continuing quite brisk.

Refined tar is moderately active in the home market at 4¾d. to 5d. per gallon, and for export at round 3½d. per gallon, both f.o.r. naked.

Creosote oil is not difficult to dispose of with prices as under: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6d. to 6½d. per gallon; neutral oil, 5¾d. to 6d. per gallon; all *ex* Works in bulk.

Cresylic acid: Demand for this product continues strong with values as under: Pale, 99/100%, 3s. 4d. to 3s. 6d. per gallon; Pale, 97/99%, 3s. to 3s. 2d. per gallon; Dark, 97/99%, 2s. 8d. to 2s. 10d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha is quietly steady at round 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha: 90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines remain nominal at about 14s. per gallon for 90/160 grade and 16s. per gallon for 90/140-grade.

The Provinces

July 21.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 10d. to 11d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha North, 1s. 6d. to 1s. 7½d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4¾d.; Scotland, 4½d. to 4¾d.; low gravity, 4½d. to 4¾d. Fuel Grade, 4d. to 4½d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £12 to £15. Salts, 70s. to 80s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 5¼d. to 5½d.; filtered heavy oil (min. gr. 1,080), 5¾d. to 6d.; heavy anthracene oil gr. less than 1,080, 6d. to 6¼d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note in our issue of Sept. 4, 1940, p. 404.

Meters, Ltd.

Mr. J. Morley, Chairman and Managing Director, stated at the 44th annual meeting of Meters, Ltd., at Manchester, on July 22, that the net profit of £12,990 for the year ended March 31 showed a decrease compared with the previous year, partly accounted for by higher income tax and partly by additional depreciation. The subsidiary company had again had a successful year and paid a good dividend. Gratitude and thanks were due to the management, staffs, and workpeople for their loyal co-operation under difficult conditions. The usual interim dividends were paid last November, leaving an available balance for appropriation of £22,061.

The meeting approved the creation of a reserve for taxation of £550, and the payment of final dividends of 2¾% (actual) on the preference stock, and of 6½% (actual) on the ordinary stock, making 5½% and 9% for the year respectively, both less income tax. A balance of £13,210 was carried forward.

Gas Stocks and Shares

Stock markets closed last week in a rather subdued tone. The volume of business throughout was quieter than during the previous fortnight and prices were inclined to be irregular, although any reaction was on a moderate scale. There was less support for British Funds and, while the undertone remained firm, a few quotations gave way. Home rails were quiet and dull. Some irregularity set in among industrials, the previous favourites losing a little ground, although a few bright spots were noticeable among shipping and insurance shares. With few exceptions oil shares were inclined to give way, while a few reduced dividend announcements among teas led to weakness in this market. There was good support from the Cape for Rand dividend-payers, but others were lower on profit-taking sales.

There was still good support for Gas stocks and shares although the number of recorded transactions was not quite so heavy as during the past few weeks. Prices were well held, however, a single transaction being sufficient to cause a big rise in the quotation. A case in point last week was that of Barnet ordinary which closed 9 points higher at 109½. With the exception of Gas Light units, which gained a further 6d. to 13s. 3d., the upward tendency of the London and Suburban companies' "ordinaries" held up although a few of the fixed interest stocks appreciated up to 3 points. There were no changes of importance in the Supplementary or Provincial Lists.

The following price movements were recorded for the week:

OFFICIAL LIST

Barnet Ord.	107—112	+9
Colonial Gas Association Ord. ...	14/—16/-	+-/6
,, 8 p.c. Pref.	19/—21/-	+-/6
Commercial 3 p.c. Deb.	55—60	+1
Gas Consolidation "B" Ord. (x.d.)	13/6—14/6	July 14
Gas Light Units	12/9—13/9	+-/6
,, 3½ p.c. max. ..	38—43	+1
,, 4 p.c. Pref.	58—63	+1
,, 3 p.c. Deb.... ...	72—77	+3
Plymouth & Stonehouse (x.d.) ...	65—70	July 14
South Metropolitan 5 p.c. Red. Deb. (x.d.)	99—104	July 14
South Suburban 4 p.c. Deb.	63—68	+3
United Kingdom Gas Corporation Ord.	10/6—12/6	--/6
Wandsworth 4 p.c. Pref.	63—68	+1

SUPPLEMENTARY LIST

Gas Consolidation "A" Ord. (x.d.)	11/6—13-6	July 14

PROVINCIAL EXCHANGES

Bristol 5 p.c. mix.	83—86	+1
Liverpool 4 p.c. Deb.	95—100	-1½
Sheffield Cons.	107—109	-1
,, 4 p.c. Deb.	94—97	-1

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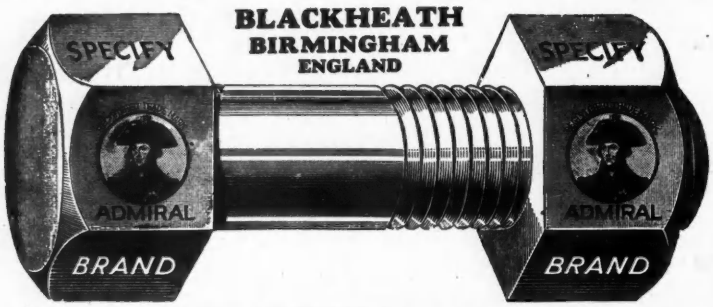

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